Prevalence and Consequences of Fluoroquinolone-Resistant *Campylobacter* Infections: NARMS 1997-2000

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Background: *Campylobacter* causes 2.4 million infections each year in the United States. Fluoroquinolones (e.g., ciprofloxacin) commonly are used in adults with *Campylobacter* and other infections. Fluoroquinolones also are used in livestock and poultry. Human infections with fluoroquinolone-resistant *Campylobacter* have become increasingly common and are associated with consumption of poultry. These, and other data, prompted FDA to propose withdrawal of fluoroquinolone use in poultry in 2000.

Methods: In 1997, the National Antimicrobial Resistance Monitoring System (NARMS) for Enteric Bacteria began monitoring antimicrobial resistance among *Campylobacter* in the Foodborne Disease Active Surveillance Network (FoodNet) sites; by 2000, the number of sites had increased to 9. Additionally, a case-control study of sporadic *Campylobacter* infections was conducted in 7 FoodNet sites between 1998-1999. Isolates collected from individuals with *Campylobacter* infections were forwarded to CDC for speciation using hippurate test and PCR, and susceptibility testing to ciprofloxacin using the E-test.

Results: NARMS tested 1202 *Campylobacter* isolates from 1997-2000; 1145 (95%) were *C. jejuni*, 44 (4%) *C. coli*, 7 (0.6%) *C. upsaliensis*, and 6 (0.5%) other *Campylobacter* species. Fourteen percent of isolates (163/1202) were ciprofloxacin-resistant (MIC >=4 µg/ml); 13% (155) of *C. jejuni* isolates, 16% (7) *C. coli*, and 0.6% (1) *C. upsaliensis*. Among 775 patients in the FoodNet Campylobacter case-control study, 11% (85) had ciprofloxacin-resistant infections. Among 421 persons with a Campylobacter infection who did not take a strong antidiarrheal medication (e.g., Imodium, Lomotil, or prescription), persons with ciprofloxacin-resistant infections had a longer duration of diarrhea than persons with ciprofloxacin-susceptible infections (8 vs 7 days, p=0.05). Of these 421 persons, 126 (30%) took fluoroquinolones and no other antimicrobial agent for their illness. Among the 126 persons who took fluoroquinolones, the mean diarrhea duration was longer in patients with ciprofloxacin-resistant infections than in patients with ciprofloxacin-susceptible infections (8 vs 6 days, p=0.04).

Conclusions: NARMS surveillance data illustrates emerging fluoroquinolone resistance of *Campylobacter* in humans. Persons with ciprofloxacin-resistant Campylobacter infections have a longer duration of diarrhea than persons with ciprofloxacin-susceptible *Campylobacter* infections. Fluoroquinolones commonly are used to treat human infections; additional efforts are needed to protect the efficacy of fluoroquinolones.

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